


Experimental Process and Industrial Control System (EPICS)
Interface Control Document
for the
Generation-3
Personnel Safety System
(PSS)
of the
Advanced Photon Source
at
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	Title: Experimental Process and Interface Control System (EPICS) Interface Control Document		Rev. 00	Approved Date 10/04/2004
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1. Introduction


1.1. Scope

This document defines the connection of the Generation-3 PSS to the EPICS. It also defines the protocol used to transmit PSS data to and from EPICS. The actual data transmitted is identified using an Excel spread sheet maintained by the SI group.

1.2. Definitions, acronyms, and abbreviations

The following are some of the frequently appearing or unique acronyms used in this document. This list is provided as a quick reference for the reader's convenience.

ACIS	Access Control Interlock System
APS	Advanced Photon Source
ASD	Accelerator Systems Division
CPU	Central Processing Unit
C&C	Command and Control
DOE	Department Of Energy
EPICS	Experimental Physics and Industrial Control System
ES&H	Environment, Safety & Health
ESD	Emergency Shut Down
FOE	First Optics Enclosure
HMI	Human Machine Interface
IOC	Input Output Controller (data collection for EPICS)
LAN	Local Area Network
OI	Operator Interface
PSS	Personnel Safety System
PLC(s)	Programmable Logic Controller(s)
PMD	Programmable Message Display
SAD	Safety Assessment Document
SDD	Software Design Document
SyRS	System Requirements Specification
TBD	To Be Defined/Decided
VME	Versa Module Euro card
XFD	Experimental Facilities Division

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1.3. Applicable Documents

The following documents form a part of this specification to the extent specified herein.

APS Documents

Document No. 1111-00001 APS Quality Assurance Plan, dated May 1990.

Drawings

EPICS Mechanical Drawings


Drawing No. 4104xxxx-210015 beamline dependent – Communication Cabling.

Precedence

In the event of conflict between the provisions of this specification and other documents, the following precedence shall apply:

This specification.

Documents referenced to the extent referenced herein.

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1.4. References

Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

Department of Energy (DOE) ORDER 420.2A, 01-08-01
Accelerator Safety Implementation Guide for DOE O 420.2A, Draft, August 2001
DOE ORDER 5480.25, 11-3-92
DOE GUIDANCE 5480.25, September 1, 1993

DOE ORDER and GUIDANCE 5480.25 are included because they were in effect and referenced when the Safety Assessment Document (SAD) was originally written; it has been superseded by DOE ORDER 420.2, which has been superseded by DOE ORDER 420.2A. DOE ORDER 420.2(A) essentially made the approved SAD the effective regulatory document.

Copies of specifications, standards, drawings and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting office.

Non-Government Documents

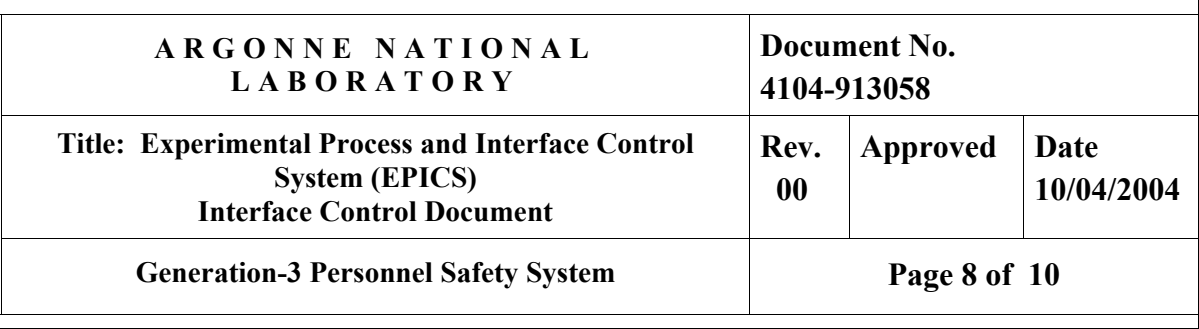
The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.


Environment Safety & Health Manual, Section 5.16 (ES&H 5.16) April 25, 2003, Argonne National Laboratory.
APS Safety Assessment Document (SAD), Rev 1, May 1999, Argonne National Laboratory, Argonne, IL.

Compliance with the following required by SAD:

Stanford Linear Accelerator Center Report 327 (SLAC 327), April 1988, Stanford Linear Accelerator Center, Menlo Park, CA.
National Council on Radiation Protection Report No. 88 (NCRP 88), Issued 30 December 1986, National Council on Radiation Protection.
Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.


Document No. 1111-00001-00 APS Quality Assurance Plan, dated May 1990.

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1.6. Notes & Exceptions

All Input Signals are High True unless otherwise noted.

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2. Equipment and Responsibilities

1.7. Overview

The PSS EPICS is the primary interface between all interested APS Users not located directly at the beamline and the PSS. It is used to provide status of the beamline to the APS personnel and to allow the Beamline Users remote control of the beamline shutters. Remote shutter operation is provided by Chain-C and all safety interlocks must be true before the shutters will actually operate. The primary use is status monitoring of the PSS and the beamline.

1.8. Responsibilities and Interfaces

ASD Safety Interlocks group.

The only interface is the connection of the EPICS IOC to the beamline Chain-C Command and Control processor.

1.9. Technical Requirements

The interface must be robust and of industrial quality. There are 2 interface options available. The first interface is the proven Profibus interface used with the PSS version 2. This is an international standard industrial interface. At this time it is the interface of choice. The second interface is the industrialized version of Ethernet. This interface is relatively new and is not yet internationally standardized. There is great promise for this interface in the future as it will provide increased performance at a significantly lower cost.

1.10. Safety Implications

Even though remote shutter operation is provided by EPICS it is a request of the PSS Chain-C Command and Control processor and all safety interlocks must be true before the shutters will actually operate.

There are no other safety implications.

3. Interface Characteristics

The interface is extremely simple requiring only a single connection between the PSS Command and Control (C&C) processor and the EPICS IOC. The Profibus interface connection is made using Profibus cable. The Ethernet interface connection is made using CAT-5E Ethernet cable. The CAT-5E cable is required as the Ethernet connection operates at 100 mega-baud.

Refer to the drawings for proper connections between the EPICS and the PSS.